

5                   FOCUSED ACOUSTIC EJECTION CELL SORTING SYSTEM AND METHOD

ABSTRACT OF THE DISCLOSURE

A method is provided for acoustically ejecting from a channel or other container a plurality of fluid droplets, each of which contains one or more particles or other localized volumes. The localized volumes, which can be living cells, are ejected towards sites on a substrate surface, a container, or a channel. An integrated cell sorting and arraying system is also provided that is capable of sorting based upon cellular properties by the selective ejection of cells from a carrier fluid. The cells can be ejected with adjustable velocity and trajectory. The ejected cells can be directed to form an array, wherein each site of the array can contain a single cell. Additionally provided is a method of forming arrays of single live cells more efficiently, rapidly, flexibly, and economically than by other cell array approaches. This method permits efficient, continuous, and simultaneous sorting of cells based upon the quantitative or semiquantitative measurement of cellular properties, and also permits non-binary or severally-branched decision-making. An integrated system, which includes a processor, and methods are also provided for the detection, selection, and ejection of selected particles or circumscribed volumes, such as live cells, from a continuous stream of fluid-suspended particles or other circumscribed volumes flowing in channels.